

(19) **United States**

(12) **Patent Application Publication**

Fores Herranz et al.

(10) **Pub. No.: US 2021/0097958 A1**

(43) **Pub. Date: Apr. 1, 2021**

(54) **PIXEL LEAKAGE AND INTERNAL RESISTANCE COMPENSATION SYSTEMS AND METHODS**

(71) Applicant: **Apple Inc.**, Cupertino, CA (US)

(72) Inventors: **Adria Fores Herranz**, Torello (ES); **Chaohao Wang**, Sunnyvale, CA (US); **Jun Li**, San Jose, CA (US); **Koorosh Aflarooni**, Los Altos Hills, CA (US); **Pierre-Yves Emellie**, Mountain View, CA (US); **Sheng Zhang**, San Jose, CA (US); **Yingying Tang**, Sunnyvale, CA (US); **Yunhui Hou**, San Jose, CA (US)

(21) Appl. No.: **17/003,730**

(22) Filed: **Aug. 26, 2020**

Related U.S. Application Data

(60) Provisional application No. 62/906,615, filed on Sep. 26, 2019, provisional application No. 62/906,619, filed on Sep. 26, 2019.

Publication Classification

(51) **Int. Cl.**
G09G 5/10 (2006.01)

(52) **U.S. Cl.**

CPC **G09G 5/10** (2013.01); **G09G 2340/06** (2013.01); **G09G 2320/08** (2013.01); **G09G 2320/0626** (2013.01); **G09G 2320/0242** (2013.01); **G09G 2320/0233** (2013.01); **G09G 2320/0606** (2013.01); **G09G 2320/0209** (2013.01)

(57)

ABSTRACT

An electronic device may include an electronic display having multiple pixels to display an image based on processed image data. Each of the pixels may include multiple sub-pixels. The electronic device may also include image processing circuitry to receive input image data, in a first color space, having luminance values for each of the sub-pixels. The circuitry may also map the input image data from the first color space to a second color space and apply a multi-dimensional lookup table, based on the input image data in the second color space, to generate compensated image data. The lookup table may receive the luminance values for each of the sub-pixels and output corrected luminance values compensated for an expected amount of current leakage between the sub-pixels. The circuitry may also inversely map the compensated image data from the second color space to the first color space to generate the processed image data.

